KORG



MONOPHONIC SYNTHESIZER SERVICE MANUAL

MS-20

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1. SPECIFICATIONS

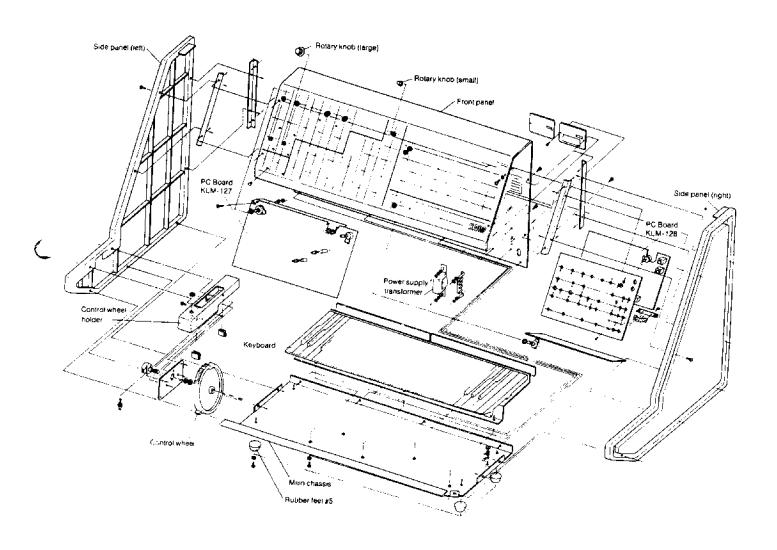
1. Keyboard	< C0	ONTROL SECTION	>	< F	XTERNAL SIGNAL	PROCESSOR >
2. Votage controlled octaves. + cent cent)			•			
Scillator 1		•		,.	001110130011011	· •
*Wave form (-					
Pulse with adjust 1: 1 ~ 1; ~ 1; ~ 1; ~ 1; ~ 1; ~ 1; ~ 1;		assimator 1				
Pulse width adjust 1: 1 ~ 1. ∞						-
Scale (16', 8', 4', 2') (6 octaves, + cent cent)						
+ cent, - cent) *Wave form (\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	3	V C C 2				•
*Wave form (\	•	V.O.O,2		2	فريمفريم اممم فريمما	
# Amplifier Out # Amplifier Out # Amplifier Out # Amplifier Out # Sand pass filter out # Portaments (max. 06 sec) # Frequency modulation intensity by MG/T_EXT (±5V) # Peak (flat ~self OSC) # Count frequency modulation intensity by Mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency modulation intensity by mg/T_EXT # (−5V ~ +5V) # Cutoff frequency mg/T_EXT # (−5V ~ +5V) # Cutoff frequency mg/T_EXT # (−5V ~ +5V) # Delay intensity by mg/T_EXT # (−5V ~ +5V) # (−5V ~ +5			•	∠.	input and output	. , , .
Pich (±1 OCTAVES)			——————————————————————————————————————			·
V.C.O. master control						-
Portamento (max. 00 sec) Frequency modulation intensity by MG/T. EXT (±5V) S. V.C.O. mixer V.C.O1 level V.C.O2 level V.C.O1 level V.C.O2 level	4	V.C.O. master	·			•
*Frequency modulation intensity by MG/T_EXT (±5V) *Frequency modulation intensity by MG/T_EXT (±5V) 5. V.C.O. mixer *V.C.O1 level *V.C.O2 level 6. Vottage controlled *Cutoff frequency modulation intensity by EG1/EXT (+5V) *Peak (flat~self OSC) *Peak (flat~self OSC) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Peak (flat~self OSC) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Peak (flat~self OSC) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *Cutoff frequency modulation intensity by MG/T_EXT (-5V ~ ±5V) *External inflation input (2OCT/V)(-5V ~ ±5V) *External inflation input (10CT/V)(-5V ~ ±5V) *External inflation input (10CT/V)(-5V ~ ±5V) *External inflation input (10CT/V)(-5V ~ ±5V) *External inflation intensity by MG/T_EXT (7.					
by MG/T_EXT (±5V)		COMMO				
Frequency modulation intensity by EG1/EXT (+5V)				2	ladiantes (LED)	
5. V.C.O. mixer V.C.O. level level V.C.O. level lev				J.	indicator (LED)	· · · · · · · · · · · · · · · · ·
V.C.O. mixer						• I rigger indicator
V. C. O 2 level	6	V.C.O. miyor		_	· - · · · · · · · · •	
6. Voltage controlled high pass filter (50Hz ~ 15,000Hz) (1-5V ~ 15V) (1-5V ~ 15V) (1-5V ~ 15V) (1-5V ~ 15V) (10-2 control voltage input (10-8ev) (10-8V) (10	J.	V.C.O. Illixer		1.	Keyboard	
Negh pass filter (50Hz ~ 15,000Hz) Peak (filar~self OSC)	_	Voltage agents all and				(exponential) $(0 \sim +8V)$
Peak (flat~self OSC) Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency control input (20CT/V)(−5V ~ +5V) External IP filter cutoff frequency control input (20CT/V)(−5V ~ +5V) External LP filter cutoff frequency control input (20CT/V)(−5V ~ +5V) External indial again control input (20CT/V)(−5V ~ +5V) External input (20CT/	о.	•	• •			 Keyboard trigger output
*Cutoff frequency modulation intensity by MG/T.EXT (nigh pass tilter	•			(+5√ ¬L _{GND})
tensity by MG/T.EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) 7. Voltage controlled low pass filter (5Hz~15,000Hz) • Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by Ed2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) • Cutoff frequency modulation intensity by Ed2/EXT (-5V ~ +5V) • External HP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) • External lP filter cutoff frequency co			·			*VCO-1 + VCO-2 control
(−5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) 7. Voltage controlled low pass filter 10w pass filter (50Hz ~ 15,000Hz) *Peak (flat ~ seit OSC) *Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) *Cutoff frequency modulation intensity by MG/T.EXT (−5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) *External HP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency control input (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency (2OCT/V)(−5V ~ +5V) *External IP filter cutoff frequency (2OCT/V)(−5V ~ +			, ,			voltage input (linear response)
*Cutoff frequency modulation intensity by EG2/EXT ((0 ~ + 6V)
tensity by EG2/EXT						◆VCO-2 control voltage input
7. Voltage controlled Coutoff frequency C						(linear response) (0 \sim 8V)
7. Voltage controlled low pass filter (50Hz~15,000Hz) Peak (flat~self OSC) Cutoff frequency modulation intensity by MG/T,EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (−5V ~ +5V) 8. Envelope generator 1 Attack time (10 sec) Peaks time (10 sec) Peak (flat~self OSC) Peak (flat~self OSC				2.	VCO	•VCO-1 + VCO-2 external
low pass filter (50Hz~15,000Hz) *Peak (flat~self OSC) *Peak (flat~self OSC) *Peak (flat~self OSC) *External signal input (3Vp-pmax.) *External signal input (3Vp-pmax.) *External HP filter cutoff frequency control input (2OCT/V)(-5V~+5V) *Cutoff frequency modulation intensity by EG2/EXT (-5V~+5V) *External HP filter cutoff frequency control input (2OCT/V)(-5V~+5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V~+5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V~+5V) *External intensity by EG2/EXT (-5V~+5V) *External intensity input (10 sec) *EG 1 envelope signal control input (0~+5V) *External initial gain control input (10 sec) *EG 1 envelope signal normal output (-5V) *EG 1 envelope signal normal output (-5V) *EG 1 envelope signal reverse output (+5V) *EG 1 envelope signal reverse output (-5V) *EG 1 trigger input (-5V) *EG 2 envelope signal reverse output (-5V) *EG 2 envelope signal rever	_		-			frequency control input
Peak (flat ~ seif OSC) * Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) * Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) 8. Envelope *Delay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 9. Envelope *Oblay time (10 sec) (-5V ~ +5V) 10. Modulation *Oblay time (10 sec) (-5V ~ +5V) 10. Modulation *Oblay time (10 sec) (-5V ~ +5V) 11. Manual controller *Oblay time (10 sec) (-5V ~ +5V) 12. P. Switch and volume *Volume *Volume *Volume *Suitch ~ Time (10 sec) (-5V ~ +5V) 13. VCV *Sixtan HP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External HP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP	7.	-	• •			(OCT/V) (+5V -5V)
*Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) 8. Envelope *Delay time (10 sec) (2CT/V) (-5V~+5V) *Release time (10 sec) (2CT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency (2CT/V) (-5V~+5V) *External LP filter cutoff frequency control input (2CCT/V) (-5V~+5V) *External LP filter cutoff frequency (2CT/V) (-5V~+		low pass filter		3.	VCF	*External signal input
*Cutoff frequency modulation intensity by MG/T.EXT (-5V ~ +5V) *Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *Total external modulation input (1 - ext)(-5 ~ +6V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *Total external modulation input (1 - ext)(-5 ~ +6V) *External LP filter cutoff frequency control input (2OCT/V)(-5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External IP filter cutoff frequency (1 - 5V ~ +5V) *External LP filter cutoff frequency (1 - 5V ~ +5V) *External IP filter cutoff frequency (1 - 5V ~ +5V) *External IP filter cutoff frequency (1 - 5V ~ +5V) *Extern						(3Vp-pmax.)
(-5V ~ +5V) Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) 8. Envelope Delay time (10 sec) generator 1 Attack time (10 sec) 9. Envelope Hold time (20 sec) generator 2 Attack time (10 sec)			• •			◆External HP filter cutoff
*Cutoff frequency modulation intensity by EG2/EXT (-5V ~ +5V) 8. Envelope						frequency control input
tensity by EG2/EXT (-5V ~ +5V) 8. Envelope penerator 1			· ·			$(2OCT/V)(-5V\sim+5V)$
(−5V ~ +5V) 8. Envelope generator 1						*External LP filter cutoff
8. Envelope						frequency control input
Delay time (10 sec) # Attack time (10 sec) # Release time (10 sec) # Hold time (20 sec) # Attack time (10 sec) # Attack time (10 sec) # Hold time (20 sec) # Belease time (10 sec) # Attack time (10 sec) # Attack time (10 sec) # Decay time (10 sec) # Decay time (10 sec) # Sustain level (0~5V) # Release time (10 sec) # Reg 1 envelope signal reverse output (
# Attack time (10 sec) # Release time (10 sec) # Release time (10 sec) # Release time (10 sec) # Attack time (20 sec) # Generator 2 # Attack time (10 sec) # Decay time (10 sec) # Release time (10 sec) # Release time (10 sec) # Release time (10 sec) # Wave form (8.	=	- · · · · · · · · · · · · · · · · · · ·	4.	VCO + VCF	
*Release time (10 sec) 9. Envelope generator 2 *Attack time (10 sec) *Decay time (10 sec) *Sustain level (0~5V) *Release time (10 sec) *Release time (10 sec) *Decay time (10 sec) *Sustain level (0~5V) *Release time (10 sec) *Wave form (generator 1				
9. Envelope generator 2 *Hold time (20 sec) (0~+5V) *Attack time (10 sec) 6. EG *EG 1 envelope signal normal output (−5V □ □ □ ○V) *Sustain level (0~5V) *EG 1 envelope signal reverse output (+5V □ □ □ ○V) *Release time (10 sec) *EG 1 envelope signal reverse output (+5V □ □ □ ○V) *EG 1 envelope signal reverse output (+5V □ □ □ ○V) *EG 1 envelope signal reverse output (+5V □ □ □ ○V) *EG 1 envelope signal reverse output (+5V □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ ○V) *EG 1 trigger input (□ □ □ □ ○V) *EG 1 trigger input (□ □ □ □ ○V) *EG 2 envelope signal reverse output (□ □ □ □ ○V) *EG 2 envelope signal reverse output (□ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V) *EG 1 envelope signal reverse output (□ □ □ □ □ □ ○V)			Release time (10 sec)	5.	VCA	· ·
*Decay time (10 sec) *Sustain level (0~5V) *Release time (10 sec) *Wave form (9.	·	· -			
*Decay time (10 sec) *Sustain level (0~5V) *Release time (10 sec) *Wave form (\(\backsimeta \) \(\lambda \)		generator 2	Attack time (10 sec)	6.	EG	•EG 1 envelope signal normal
*Sustain level (0~5V) *Release time (10 sec) *Wave form (\(\sigma \chi \sigma \chi \) *EG 1 envelope signal reverse output (+5V \(\sigma \chi \) *EG 1 + EG 2 trigger input (\(\sigma \chi \) *EG 1 + EG 2 trigger input (\(\sigma \chi \) *EG 1 trigger input (\(\sigma \chi \) *EG 2 envelope signal reverse output (\(\sigma \chi \chi \) *EG 2 envelope signal reverse output (\(\sigma \chi \chi \) *EG 2 envelope signal reverse output (\(\sigma \chi \chi \chi \) *EG 1 trigger input (\(\sigma \chi \chi \chi \chi \chi \) *EG 2 envelope signal reverse output (\(\sigma \chi \chi \chi \chi \chi \chi \chi \chi			* Decay time (10 sec)			· -
*Release time (10 sec) *Wave form (\			Sustain level (0∼5V)			
*Wave form (Release time (10 sec)			
generator □ ~ □ ~ □ • Frequency (1: 1 ~ 1:80) 11. Manual controller • Control wheel (center click) • EG 1 trigger input (□ L _{GND}) • EG 2 envelope signal reverse • Output (□ L _{GND}) • Triangle output (□ ~ △ △ △ △ △ △ △ △ △ △ △ △ △ △ △ △ △ △	10.	Modulation	*Wave form (\rangle ~ \langle ~ \sqrt{1},			
*Frequency (1: 1 ~ 1:80) *In Manual controller *Control wheel (center click) *EG 1 trigger input (□ L _{GND}) *EG 2 envelope signal reverse output (□ L _{GND}) *EG 2 envelope signal reverse output (□ L _{GND}) *Triangle output (□ C _N OV) *Triangle output (□ C _N OV) *Triangle output (□ C _N OV) *Volume *Volume *Volume *Volume		generator	·			== :
*EG 2 envelope signal reverse (0.1Hz ~ 20Hz) *Momentary switch 7. MG *Triangle output (
(0.1Hz ~ 20Hz) • Momentary switch 7. MG • Triangle output (11.	Manual controller	*Control wheel (center click)			
*Momentary switch 7. MG *Triangle output (\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						· -
T_GND (5Vp-pFv0V) 12. P. Switch and *Volume • Rectangle output (□ ~ □ ~ volume Volume			Momentary switch	7.	MG	
12. P. Switch and ◆Volume • Rectangle output (☐ ~ ☐ ~ volume			T LGND	-		•
volume	12.	P. Switch and	*Volume			
	13.	Indicator	*LED (KBD trigger, MG rate)			(பா::::5v)

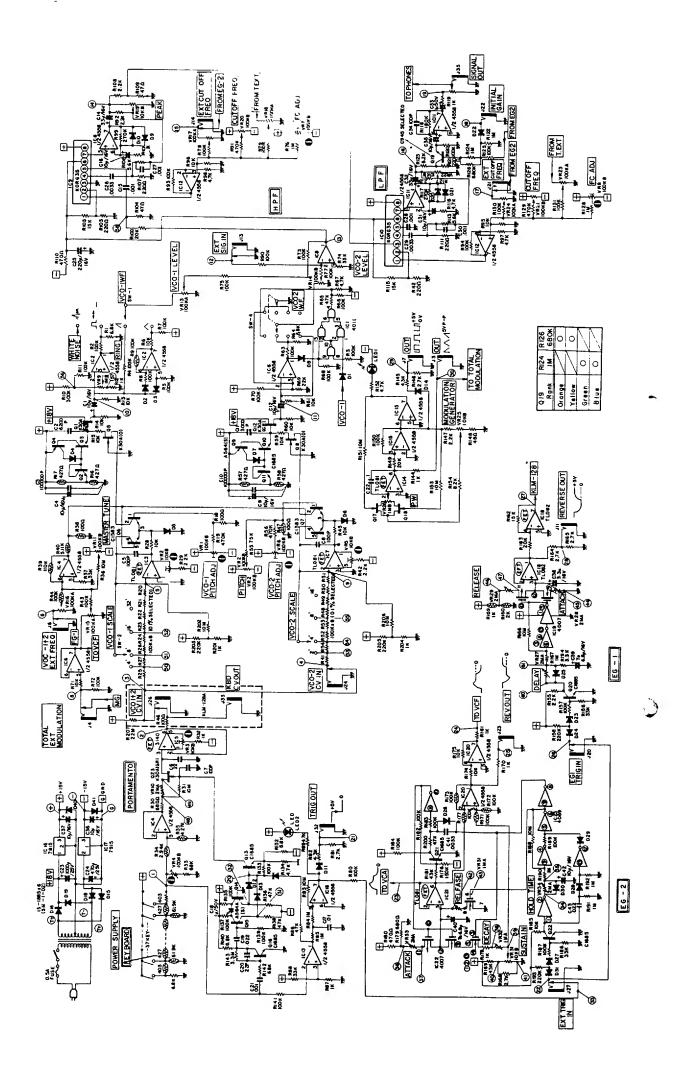
8. Noise generator	*Pink noise output (5Vp-p ±20) *White noise output (5Vp-p ±20)
9. Sample and hold	*Clock trigger input (□LGND) *Sample signal input (5Vp-p max.)
	*S/H output (5Vp-p max.)
10. Modulation VCA	 Control voltage input (0 ~ + 5V)
	 Signal input (−5V ~ +5V)
	*Signal output (−5V ~ +5V)
 Manual controller 	*Control wheel output
	$(-5V \leftarrow 0V \rightarrow +5V)$
	Momentary switch output
	(Trans)

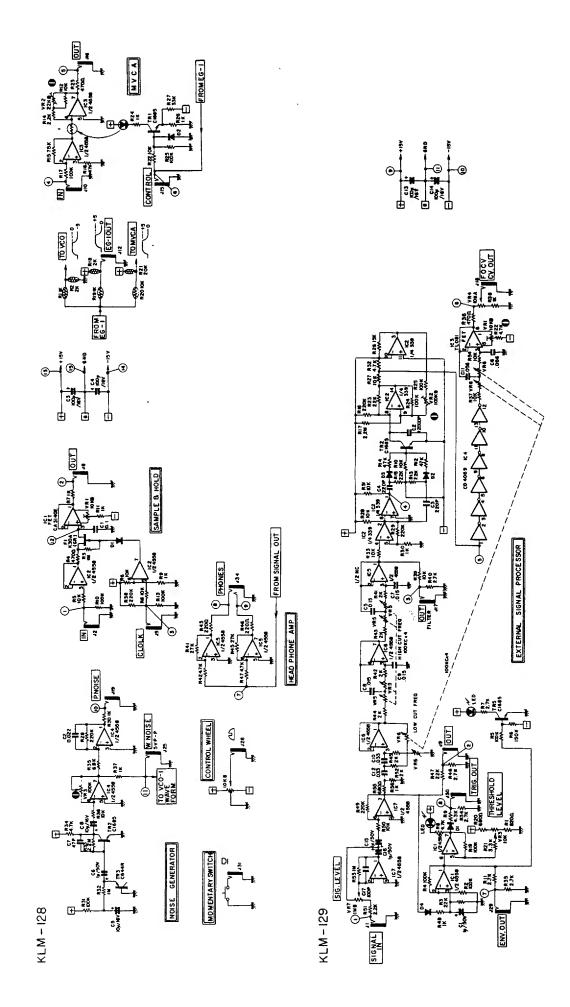
12. Signal out	 Signal output (2Vp-p output in- pedance 3.5kΩ)
13. Head phones	*Head phones output ((8Ω) 120m watts 5.6)
44 5	
14. Power consumption	n* 10 watts
15. Dimensions	*569(W) x 309(D) x 249(H) mm
16. Weight	◆7.7 kgs
17. Accessories	*Patch cord, connection cord (35 cm x 2, 3 m x 1)
18. Options	*Stand, hard case, foot pedal (MS-01)
	*Junction box (M\$-02)

2. STRUCTURAL DIAGRAM

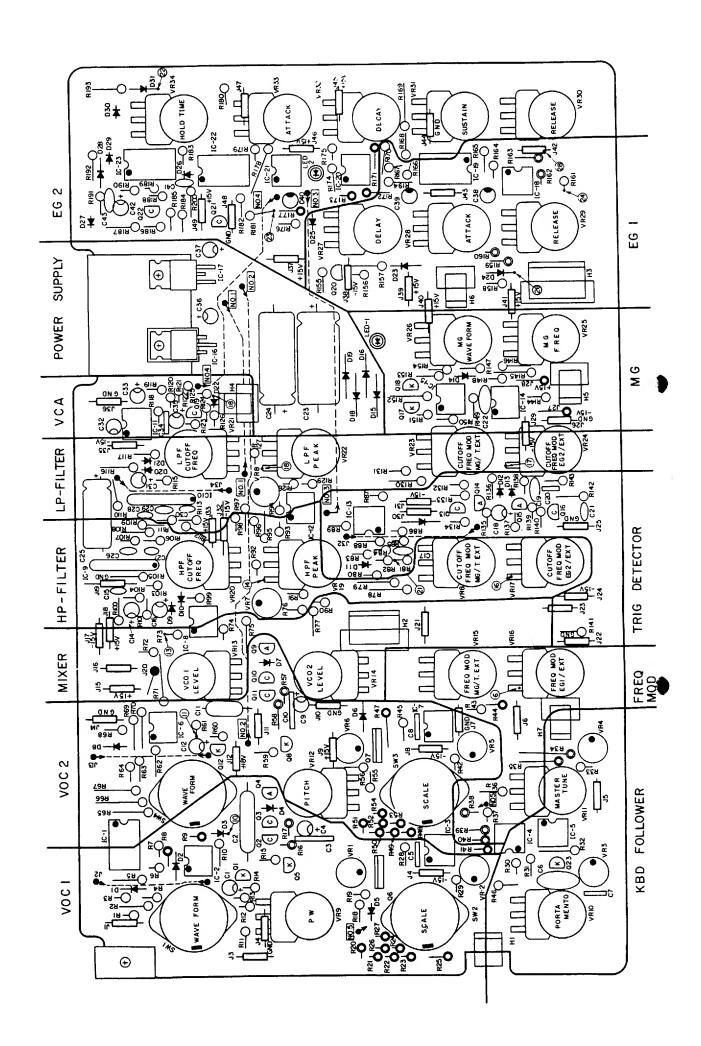
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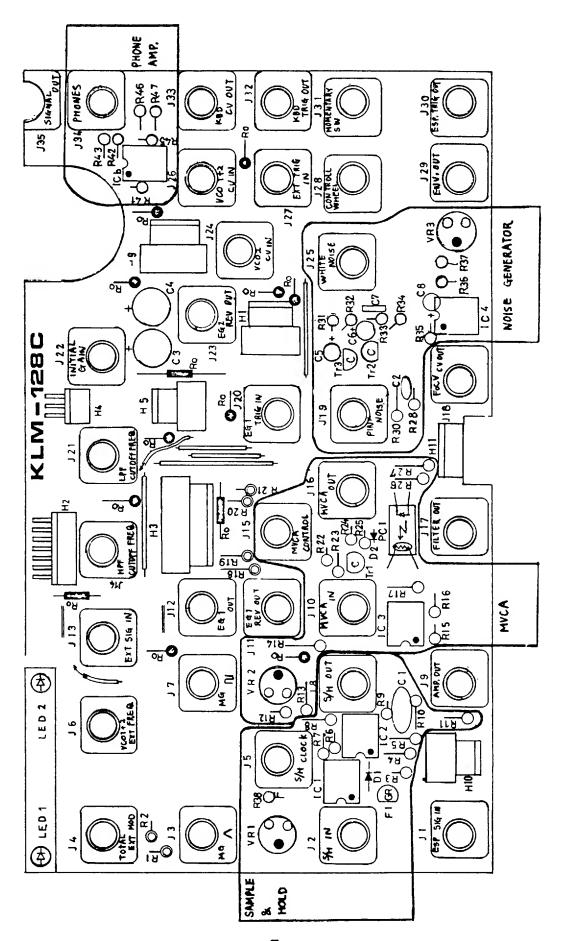




4. FRONT VIEW OF PRINTED CIRCUIT BOARD KLM-127



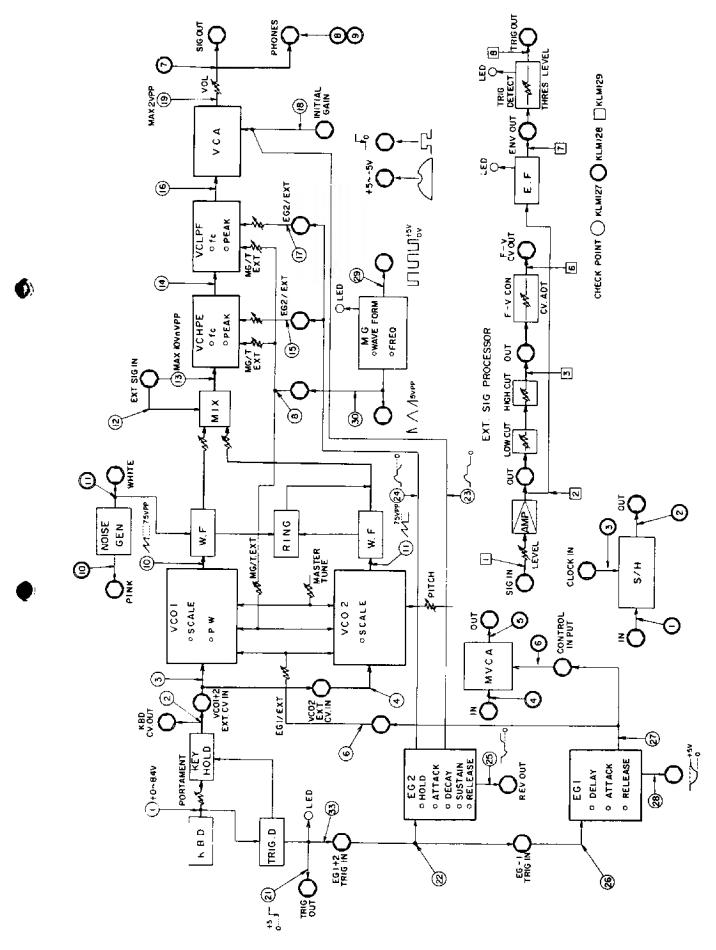
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5. PARTS LIST (Mechanical parts not listed)

DRS 1	X X	50V-3000pF 50V-6200pF ●POLYPROPP CAPAC 200V-0.22µF		ot lis STO x	n ●METAL FILM RESI
ENE DRS 1 DRS 4 1	YL X ST(X X	50V-6200pF •POLYPROPP CAPAC	2 18	_	●METAL FILM RESI
DRS 1 DRS 4 1	STO	CAPAC	2 18	_	METAL FILM RESI
DRS 1 DRS 4 1	STO	CAPAC	18	х	
1 DRS 4 1	STO X X				1/4W 1% 100Ω
DRS 4 1 2	ST(× ×	200V-0.22μF	22	X	1/4W 1% 403Ω
1 2	×			X	1/4W 1% 427Ω
1 2	×		3	х	1/4W 1% 1kΩ
1 2	х	●TRANSI:	э	X	1/4W 1% 2kΩ
2		2SA-564(S)	1	X	1/4W 1% 2.94kΩ
	x	2SC-945(L)K	1	X	1/4W 1% 4.27kΩ
	x	(special selected)	1	X	1/4W 1% 10kΩ
13		2SC-1583G	1	x	1/4W 1% 15kΩ
	×	2SC-1685S	2 [X	1/4W 1% 20kΩ
1	х	2SC-644R	17	x	1/4W 1% 61.9kΩ
			23	x	1/4W 1% 100kΩ
FET	•		1	x	1/4W 1% 110kΩ
4	×	2SK-30(O)	1	х	1/4W 1% 5.11kΩ
4	х	2SK-30(GR)			
			AS	STO	SOLIO RESI
DES	οlo	•0	7	х	1/4W 10% 10MΩ
33	ж	1S-1555			
			RS	ITO	●MYLAR CAPAC
LED	•		sted	ot lis	п
4	х	GD4-203RD	1		
			RS	ITO	●STYROL CAPAC
LER	UP	 PHOTOCO 	1	х	50V-12000pF
1	х	HTV-P873-G35-201B			
			PRS	OTI	● CERAMIC CAPAC
●IC			1	Х	50V-56pF
17	X	μPC-4558C	1	X	50V-22pF
5	X	081	5	х	50V-100pF
		TL-(071)	2	X	50V-220pF
		(3140)	1	×	50V-47pF
1	х	082	2	х	25V-100000pF
		TL-(072)			
		(3140)	PS	HTC	TANTALUM CAPAC
2	х	MC-14007	1	x	16V-3.3 _# F
2	×	MC-14069B	2	х	16V-6.8 μ F
1	×	μPD4011C			
1	x	μPC339C	ORS	ITO	CTROLYTIC CAPAC
1	х	μPC14315	12	X	46V-10µF
1	×	A79M15پ	2	×	16V-33 _# F
2	×	KORG35	4	х	16V-100μF
			6	х	50V-1μF
ORS	ST	●SEMI-FIXED RESI	1	x	25V-470 _µ F
6	Х	SR19R(10kB)	1	х	25V-10000μF
7	X	SR19R(100kB)	1		16V-220 _# F
) "			
	FET 4 4 4 DES 33 LED 4 LER 1 1 2 2 1 1 1 1 2 2 CORS 6	FET x 4 x 4 x 4 DIODES x 33 • LED x 4 UPLER x 1	2SK-30(O) x 4 2SK-30(GR) x 4 DIODES 1S-1555 x 33 LED GD4-203RD x 4 PHOTOCOUPLER HTV-P873-G35-201B x 1 IC μPC-4558C x 17 081 x 5 TL-(071) (3140) 082 x 1 TL-(072) (3140) MC-14007 x 2 MC-14069B x 2 μPO4011C x 1 μPC339C x 1 μPC14315 x 1 μA79M15 x 1 KORG35 x 2 SEMI-FIXED RESISTORS SR19R(10kB) x 6	23 1	x 23 x 1 x 1 2SK-30(O) x 4 2SK-30(GR) x 4 2SK-30(G

6. BLOCK DIAGRAM



7. ADJUSTMENT PROCEDURE

7-1 Power supply check

1. Positive rippie.

Should be no more than 2mVp-p. Set oscilloscope vertical gain at 10mV/cm and check that power supply ripple is 2mV or less.

Negative ripple.

Same as positive, should be no more than 2mVp-p.

7-2. Pitch adjustment

1. VCO-1.

Perform adjustment with synthesizer controls at "normal setting" (Scale=8, Waveform= \sqcap 1, Master Tune, Pitch, and all other knobs at "0"). See figure 1.

- a. Play C-4 (high C) on the keyboard and adjust the high semi-fixed screw until you obtain the correct tuning as indicated by WT-10A (connected to the SIG OUT jack).
- b. Play key C-1 and adjust the low semi-fixed screw.
- c. Repeat steps a and b as many times as necessary until both are tuned to the correct pitch.
- d. Check the tuning of C-1, C-2, C-3, and C-4 on the WT-10A meter to make sure pitch deviation is within ± 2 cents for each.

- e. Change the scale to 32', 16', 8', and 4' and check the tuning of all four C keys to make sure that the pitch deviation of each is within \pm 10 cents.
- 2. VCO-2.

Set the VCO-1 level at "0" and the VCO-2 level at "10". Then follow the same procedure as for VCO-1, by adjusting the high and low semi-fixed screws.

7-3. KBD CV adjustment

Use a 4-1/2 digital voltmeter to measure the KBD CV OUT signal.

- a. Measure output voltage first when you play key C-4, then when you play key C-3. The output voltage for C-3 should be exactly half that for C-4. Adjust the KBD CV high semi-fixed screw as necessary so that C-3 produces half the voltage of C-4.
- b. Measure C-2 and then C-1 in the same way. Adjust the KBD CV low semi-fixed screw as necessary so that C-2 produces exactly half the voltage of C-4.
- c. Repeat steps a and b as many times as necessary until the output voltage of each of C-1, C-2, C-3, and C-4 is exactly half that of the next.

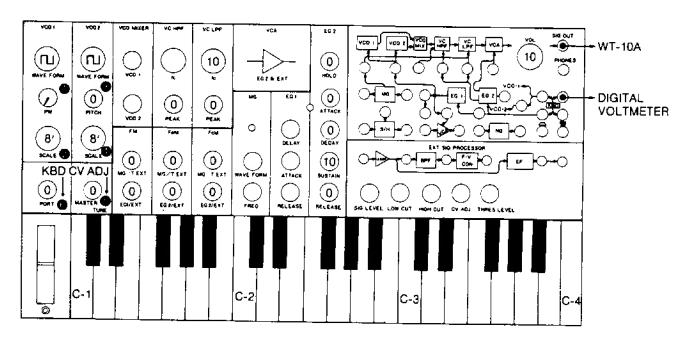


Fig. 1

7-4. VCF Fc adjustment

Connect a frequency counter to the PHONES jack (since a high output level is needed for measurement). Set VCO-1 and VCO-2 level at "0".

1. VC HPF

C

Refer to the settings shown in figure 2. Set the LPF PEAK knob at "0", and the HPF PEAK knob

at "10". Then adjust the **1** semi-fixed screw as necessary so that the HPF oscillation frequency is 500Hz.

2. VC LPF

Set HPF PEAK at "0", and LPF PEAK at "10". Then adjust the semi-fixed screw in the same way as you did for the HPF.

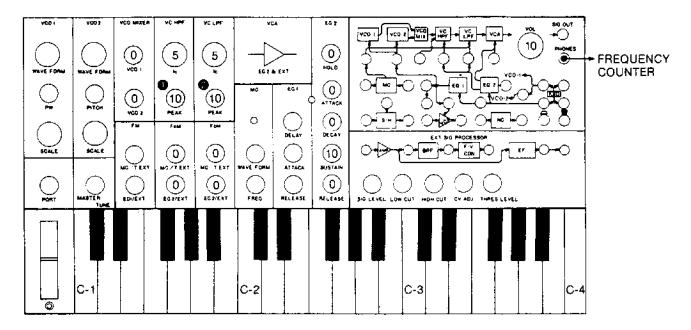


Fig. 2